Embroidered electrochemical sensors on gauze for rapid quantification of wound biomarkers

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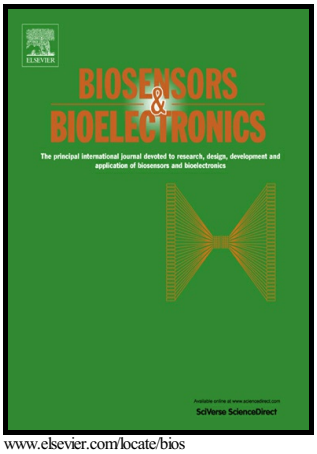

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Embroidered electrochemical sensors on gauze for rapid quantification of wound biomarkers

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Abstract

Electrochemical sensors are an attractive platform for analytical measurements due to their high sensitivity, portability and fast response time. These attributes also make electrochemical sensors well suited for wearable applications which require excellent flexibility and durability. Towards this end, we have developed a robust electrochemical sensor on gauze via a unique embroidery fabrication process for quantitative measurements of wound biomarkers. For proof of principle, this biosensor was used to detect uric acid, a biomarker for wound severity and healing, in simulated wound fluid which exhibits high specificity, good linearly from 0 to 800 μM, and excellent reproducibility. Continuous sensing of uric acid was also performed using this biosensor which reveals that it can generate consistent and accurate measurements for up to 7 hours. Experiments to evaluate the robustness of the embroidered gauze sensor demonstrate that it offers excellent resilience against mechanical stress and deformation making it a promising wearable platform for assessing and monitoring wound status *in situ*.

Keywords: Electrochemical sensor; gauze; embroidery; wearable; wound monitoring